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Basic Guideline for Rehabilitation of Patients with Cleft Palate

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Abstract

For the last quarter of a century, surgical techniques and speech therapy for the patient with cleft lip and palate have made remarkable progress, as other professional areas. However, recent survey of our patients and their family revealed that their needs and demands for medical and non-medical treatments had developed to a higher level and more comprehensive one.

It goes without saying that the goal of rehabilitation for the patient with cleft lip and palate should not be limited to mere acquirement of a normal speech. With the recent advances in medical, surgical, orthodontic, and speech-therapeutic procedures, more attention is being directed to support of the patients and their family in the area of social functioning. Interdisciplinary cooperation is essential to an integrated cleft palate rehabilitation. This paper describes some of our recent steps toward that integrated approach.

The subjects for discussion in this paper include 1. counselling techniques designed to promote healthy psychosocial development for parent and adult patients, 2. parent education according to rehabilitation program, 3. training camp, picnic and physical exercises for pre-school and early-school-age children, 4. velopharyngeal function test, i.e. nasoendoscopy, radiovideoscopy, and pneumotachography, and 5. training procedures used in our clinic to facilitate the correction of articulation errors, especially for adult patients.

Introduction

The risk of having a cleft palate baby is said to be about one every 500 births, if the parents have no pertinent family history. With recent advances in medical, surgical, or orthodontic and speech therapy procedures, ha bilitation for the patients with cleft lip and palate has made remarkable progress. That is to say, about 25

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years ago, nylon or Dexon sutures were not available. The surgical result at that time was such that only 60 per cent of the cleft palate patients operated upon acquired a normal speech, and the lip scars were quite conspicuous. But recently about 90 per cent of the patients obtain complete velopharyngeal function and a normal speech after palatoplasty, and the lip scars are generally very inconspicuous. Surgeons seem to be satisfied with these results.

But our recent survey of 320 patients who visited our clinic from 1977 to 1980 indicated that their needs and desires for medical and rehabilitative treatments became highly advanced and more complex, surpassing the advancement in medical, or surgical treatment and speech therapy. For example, more inconspicuous scar and orthodontic treatment are desired. More attention should be paid to an integrated approach to correct their physical defects and speech disorders, encouraging them for social activity.

From these view-points, our recent integrated therapeutic program for patients is outlined in this paper. Programs to promote physical and mental development of the patient with cleft lip and palate.

1. The initial interview

In the initial interview, the parents are advised about their children's growth and development, such as what kind of nipples are recommendable for feeding the child. Explanation is also made about the time of surgery and other therapeutic programs. Such counselling gives the parents a psychological support and hope for a happy future life.

The parents were shocked at the birth of cleft lip and palate infant, and influenced by complex sentiments of disappointment, guilty, aggression, hostility, and helpless resentment. Few parents express these feelings directly, though we have experienced that if the parents care and rear their child in a sense of insecurity, their baby would grow up with developmental deviation under the influence of parents' anxiety.

The case A and B as described below exemplify the notion. Fig. 1 shows the profile of Tsumori Developmental Test in case A of bilateral cleft lip and palate. A dotted line shows the profile at the age of 4 and a half years. He had mental retardation, paticulary in social and basic life habits aspects. Until that age, he had lived in one narrow room in an apartment house with his mother. They seldom went out except to hospital by taxi cab, because the mother was afraid of the baby being watched curiously on the street.

We had counselling with the mother several times to let her accept her child emotionally and advised her to send the child to a nursery school. After six months, his mother was divorced and started to work in a department store to make a living. They lived with his grand father who took care of him, and grand mother who was ill in bed with cerebral apoplexy and liver cancer. He had been isolated from the neighbors, just watching TV at home. Two and a half years after the last test, he

displayed the developmental attitude as shown by the solid line in Fig. 1. His motor ability at the age of seven was far behind, only at 4 years and a half level. The lack of physical exercise seemed responsible for this delay. It appeared that the parents' discord at least partially led him to both mental and physical delay and we did not have any effective means to solve their problems. Through the experi-

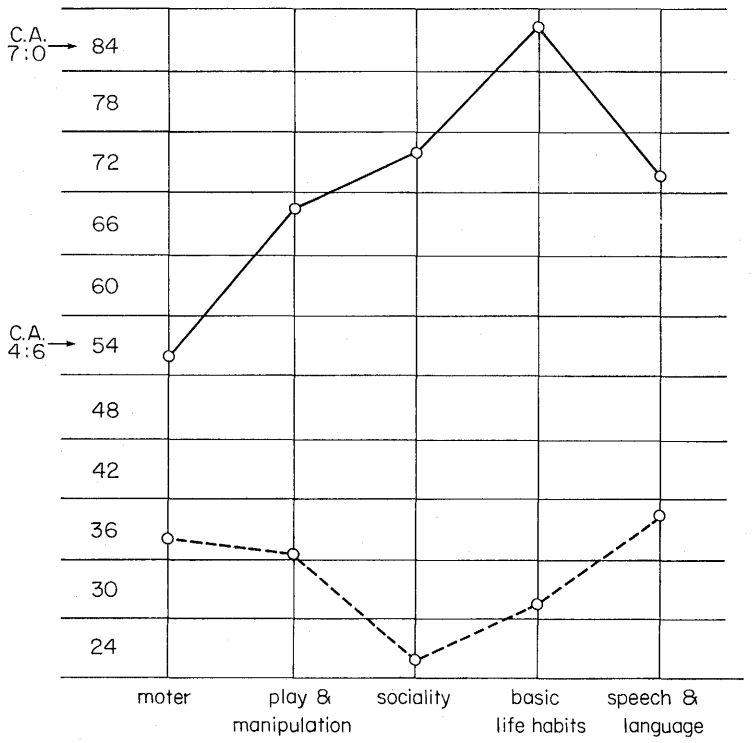

Fig. 1. The profile of Tsumori Developmental Test (case A)

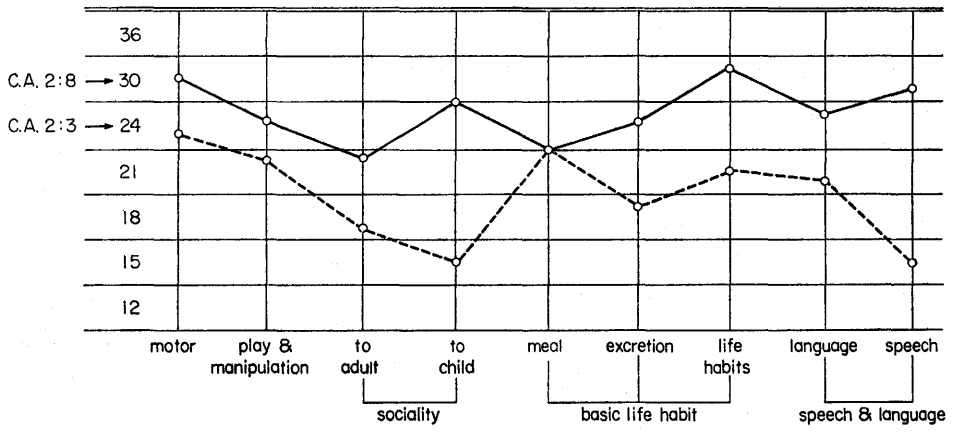

Fig. 2. The profile of Tsumori Developmental Test (case B)

ences with the case, we recognized the importance of guidance for the parents.

For the case B of unilateral cleft lip and palate, we had counselling with the parents many times. Fig. 2 shows the profile of Tsumori Developmental Test for case B. The dotted line represents the one at 2 years and 3 months. Some general delay is apparent, specially in sociality and speech and language. For this case we took non-directive counselling with his mother several times. The mother first expressed negative and aggressive feelings to her child but gradually began to accept the child emotionally. We recommended the mother of the following three points; (1) Training his body and mind by means of taking a walk or climbing mountain. (2) Playing with many friends out of doors. (3) Getting into the basic life habits of putting on and off his clothes and shoes by himself. Five months after the recommendation, he grew up in the items of sociality and speech as demonstrated by the solid line in Fig. 2.

As mentioned above, at the first interview, guidance of parents by explaining the surgical and other therapeutic schedule and by psychoanalysis is critically important to relieve them from their emotional burden and to promote the child development.

2. Training of pre-school and school children with psychosocial problems

Many children older than 5 or 6 years, have not only articulation disorders but also psychosocial problems. In such patients, some organic and/or developmental disorders may be suspected but undesirable environments appear more likely to be related with this psychosocial problems.

In search for any effective measures to solve the problem, we have held for 4 years a training camp for them every month, the program for which includes play therapy, speech therapy, group counselling and even such physical exercises as running and climbing. The therapeutic effects appear quite obvious and even dramatic in some. A kind of mutual sympathy was developed among the patients and between the patients and the therapists.

Speech Training Program

1. Examination of velopharyngeal function

One of the most important prerequisite for a normal speech is a competent velopharyngeal function which is required for sufficient oral air-pressure during speech. The causes for insufficient oral pressure are multiple, maybe due to (1) velopharyngeal incompetence, (2) nasal emission through palatal fistula or perforation or (3) rarely wrong articulatory habits to produce intra-oral pressure. Therefore the first step of our therapy for cleft palate speech must be thorough examinations for these factors, including measurement of the oral pressure. Several methods we use for examining velopharyngeal function are listed in Table 1. The items from 1 to 5 are diagnostic but the items from 6 to 8 are rather for reference.

Table 1. Diagnostic Means and Criteria for Velopharyngeal Function

Diagnostic Means	Criteria		
	incompetence	slight incompetence	competence
1. hypernasality (listener's judgement)	apparent	slight	none
2. pneumotachography (velopharyngeal resistance: dyne sec/cm^5)	below 50	51 - 100	above 101
3. observation of stainless plate for nasal emission expressed in scale (rhinometric mirror)	scale $>$ 3	1 - 3	$<$ 1
4. nasoendoscopy (fiberscopy)	no closure	imperfect closure	closure
5. fluorovideoscopy	no closure	imperfect closure	closure
6. inspection (per oral)			
distance between velum and posterior pharyngeal wall	long	fairly long	normal
velum movement	poor	slightly poor	normal
lateral wall movement	poor	slightly poor	normal

*The finding No. 6 including 3 items is not definitive but only supplementary for the diagnosis.

Fig. 3. Pneumotachography

Pneumotachograph is used to measure oral pressure and nasal flow objectively and the velopharyngeal resistance can be calculated. This method, without any burden of pain to patient, can be applied to children over 4 years of age.

Fluorovideoscopy, applicable to children over 4 years, is a useful diagnostic means which demonstrates the lateral pharyngeal wall, posterior pharyngeal wall,

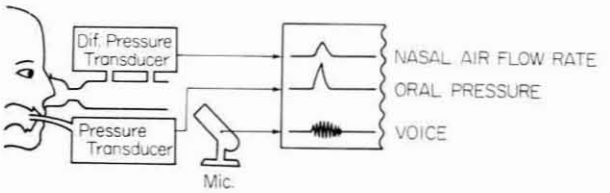

Fig. 4 Diagram showing instrumentation for simultaneous measurements of nasal-air-flow rate and oral-breath-pressure.

Fig. 5. Fluorovideoscopy

Fig. 6. Nasoendoscopy (Fiberscopy)

and velum in action associated with running speech. To cite a clinical example, slight velopharyngeal incompetence can frequently be corrected by speech therapy, when the fluorovideoscopy demonstrates occasional contacts of the velum with the posterior wall. In other words, it often predicts the prognosis after speech therapy, increasing the efficiency of speech therapy.

Fiberscopy is superior to other means in permitting a direct observation of the velopharyngeal aperture but, due to the pain attendant to insertion and the dimensional limitation, it is hardly applicable to younger children under 4 or 5 years. Another disadvantage of fiberscopic examinations is that the finding is inconsistent to some extent and greatly dependent upon the position and direction of the scope-setting. Among various types of fiberscope we prefer a flexible one with a diameter 4.4 mm but sometimes also use a rigid type 4 mm in diameter for adult. The rigid one gives the clearer images than the flexible one.

Judgement of V–P function in 2 or 3 years old children is obliged to rely on more subjective or simpler methods: Peroral inspection, auditory judgement of nasality, or rhinometoric mirror.

From the view-point of speech therapy, it should be emphasized that the "slight velopharyngeal incompetence", as defined by the criteria listed in Table 1, can often be corrected to a normal level by speech therapy alone. At the worst, it can be much improved to the level of clear intelligible speech (articulation) with slight nasality only by speech therapy. Our clinical experiences of such velopharyngeal incompetence where speech therapy was most effective are mostly associated with submucous cleft palate and congenital velopharyngeal incompetence, although much remains to be further studied. It is a kind of semi-routine procedure in our clinic to institute a 2 to 3 months speech therapy as a trial for a child with velopharyngeal incompetence who anyway has to await for his turn of admission for a half year. Very frequently, those who achieve /p/ production in a couple of months can be improved to normal only by speech therapy.

Palatal fistula, unless it is over 5 mm $\times$ 5 mm, does not influence the speech so much as to produce articulatory distortion. But if it is located just in the midline, it can affect the speech, even if it is as small as 2 mm $\times$ 5 mm. Some, not many though, cases of slight velopharyngeal incompetence are complicated by small fistula and inadequate articulatory process of building up the oral pressure. For those cases, the order of diagnosis to be employed should be 1. temporary closure of the fistula with a cotton ball or prosthesis, 2. articulation training and then 3. diagnosis of velopharyngeal function.

Recent survey on our out-patients in speech clinic revealed that those referred to us from other institutes had velopharyngeal incompetence in 53.1 per cent, which indicates how critically important the diagnosis of velopharyngeal function is.

2. Articulatory training

Faulty articulation in cleft palate patient becomes less likely to be improved spontaneously if the child is over 4 years of age. Immediate speech therapy is recommended for those children if they have no or only very slight velopahryngeal incompetence. Practical method for articulatory guidance consists of (1) adequate intraoral management of the expiratory air-flow, (2) articulatory management. The auditory training such as related to the awareness of the error, or discriminative ability need not be instituted as a separate entity but is better adopted on occasion in the process of articulatory training.

(1) Intra-oral pressure management.

Intra-oral pressure management, which seems rather overlooked so far, is one of the key-issues in our speech therapy. It refers to the articulatory process to build up and release the intra-oral air pressure. Many cleft palate patients retain faulty articulatory habits such as plosive emission of air through the nose for [pa] (nasal articulation) or inspiratory plosive sound production, even after attaining competent velopharyngeal function.

More specifically, the intra-oral pressure managements are practised by; 1. easy blowing toward a candle flame, and simultaneous flipping the lower lip with the finger, thus leading from [ΦΦpΦΦ...] to [pu]. 2. Puffing the cheeks and sudden press of the cheeks with the palms, again leading to [pu].

Hard blowing exercise does not seem effective and is not included in our training program.

After the above training, the patient proceeds to articulation training for special consonants [p] or [t]. At the early stage of training for [p] or [t], the patients should be made aware of the plosive emission of air by means of a sheet of paper hung in front of the mouth for instance.

(2) Articulatory management.

The patients may exhibit many articulatory errors, but it is unnecessary to make active speech training for all these errors. It is our current therapeutic policy to train for consonants [p], [k], [t], [ɕ] only for children under 6 years and [tɕ], [ts], [s] on occasion for older children. Correction of these consonant errors usually leads to that of the others spontaneously in most of the cases. From our clinical experiences and stand-point of articulatory development with age, the order of consonants to be corrected by training is set as shown in Fig. 7; [p], [k] and [t] or [ɕ] for pre-school children, and followed by [tɕ] or [ts], and [s] for school children or adults. After one of those consonants is pronounced correctly at word level, we advance to the next consonant according to the training step in Fig. 4. If the patients need a short-term training program, it may be necessary to teach two or three consonants at the same time. Actually, some patients over 10 years easily acquired two or three consonants at the same time.

Table 2. Subjects of Speech Training

Subject	Age	Number
pre-school children	3:4— 6:0	23
school children	6:1—12:10	17

Table 3. A mean training period (in month) required for the speech improvement

Achievement level / Subject	Word level	Conversation level
pre-school children	8.4	3.0
school children	5.8	10.7

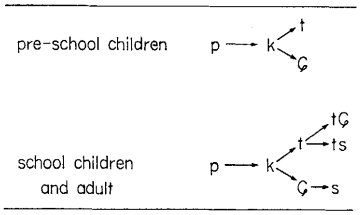

Fig. 7. Minimal essentials to treat mis-articulation

Table 2. and 3. show the period of speech therapy required for improvement. The subjects of this investigation include 23 pre-school children, 17 school children all of whom came to our clinic from March, 1975 to October, 1979. Once the pre-school children achieved normal articulation at word level, it takes a short term to make further improvement even at conversation level just by rather simple training such as singing a song. It takes a long term for the school children to improve their speech at conversation level, though it takes shorter term than pre-school children at word level. Adult patients, showed a similar but more distinct tendency than was described for school children. Practical training methods for each consonant will be given elsewhere.

(3) Speech therapy in adult patients

It has been generally believed that mis-articulation in adult patients is extremely difficult to be improved. Since 1978, we have repeatedly reported[1),2)] that satisfactory results can be obtained by speech therapy in adult patients with cleft palate. More and more adult patients have been since accumulated who cured their deviated speech (see Fig. 8). Treatment on adult patients is essentially the same as that on pre-school and school children, which includes examination of velopharyngeal function and teaching of pronunciation of consonants. But it takes longer term for the adult to improve the speech even at conversation level than for children. The

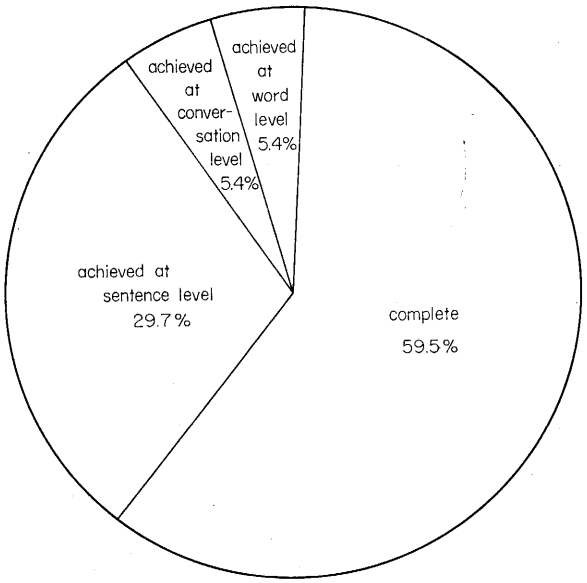

Fig. 8. Speech improvement by speech training in adult cleft palate patients, from 1976 to 1981 (N=32)

treatments we devised specially for adult patients are as follows; 1. pronunciation of meaningless syllables in succession, 2. singing a song, 3. playing a drama, and 4. training of sentences such as used in daily life (conversation on telephone for example). As we accumulate clinical experiences with adult patients, we feel keenly that many of them have had various psychological or social adjustment problems for a long time; i.e. one cannot answer on the phone or try to avoid conversation with others etc., because of his or her distorted speech and or lip and nose deformities. We have been counselling with adult patients in our hospital, and we have held a training camp once a month, where we perform concentrative speech training and group counselling. The training camp has such merits as follows; 1. much more trust and sympathy developed between therapists and patients, and among patients. 2. they are thereby much more motivated to correct their mis-articulation. 3. they enjoy recreation in union and having dinner all together.

Conclusion

The points of speech training for the patient with cleft lip and palate are as follows;

1. The goal should be not only to acquire a normal speech but also to promote and to achieve a healthy psychosocial development.
2. Standing on this view-point, initial interview with the parents should be emphasized, which includes explanation of surgical schedule, special care of the baby, and above all encouragement and advice for the family.

3. Thorough examination of velopharyngeal function is essential prior to any speech training for cleft palate patients. The patient with good or slightly poor velopharyngeal competence should be selected for speech training. In addition to articulatory management, the training of how to build up the intra-oral pressure required for speech appears to be a key-issue in the whole program.

4. With the recent advance in speech training technique, articulatory errors in adult patients became not so resistant to speech therapy as they used to be maintained. Now they are curable.

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